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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/686,408	10/11/2000	LI YANG	791_119	6047

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EXAMINER

CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 04/14/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/686,408

Applicant(s)

YANG ET AL.

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- ☐ Interview Summary (PTO-413) Paper No(s). _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 26, 2003 has been entered.

Response to Amendment

2. In response to the amendment received February 3, 2003 and entered as per the RCE filed March 26, 2003:

- a. The specification has been entered as indicated in the earlier advisory action;
- b. The prior art rejections stand;

The obviousness double patenting rejection stands.

Response to Applicants Declaration

3. In response to the declaration received February 3, 2003: the declaration has been considered but is not persuasive as set forth in items a-c in the Advisory Action mailed February 26, 2003, incorporated herein.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 10 116 631 A (JP '631), of record and for the reasons of record.

JP '631 discloses a lithium secondary battery comprising: an electrode body having a positive electrode 5 and a negative electrode 4 disposed about opposite sides of separator 3 (Fig. 1). While the language of winding or laminating is a process step and not held to further limit the end product, the electrode body as shown in Fig. 1 is wound (see page 10 of the uncertified translation of JP '631, in particular paragraph [0077]); a non-aqueous electrolytic solution containing a lithium salt (lithium compound) wherein the electrolytic solution contains water and hydrofluoric acid in a total maximum concentration of 150 ppm or less. The moisture content of the whole cell 2000 ppm or less and preferably 500 ppm or less (abstract and paragraph [0073] as applied to claim 1).

The lithium compound is LiPF₆ (page 3 of translation, paragraph [0027] as applied to claim 2).

Since the prior art product has the same structure and reduced levels of water and HF in the electrolytic solution, as recited in claim 1, it is expected that the capacity of the battery will be 2 Ah or more.

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. In re Best, 562 F.2d at 1255, 195 USPQ at 433. See also Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). See also MPEP § 2112.01 (as applied to claim 9).

Response to Arguments

6. Applicant's arguments filed February 3, 2003 have been fully considered but they are not persuasive.

Applicant argues that JP '631 fails to disclose or suggest any limit on the concentration of water adsorbed by the battery members and therefore does not teach or suggest limiting the HF and water content in the battery.

The Examiner respectfully disagrees.

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First the prior art of JP '631 clearly dries the battery components (electrodes and electrolyte) to remove and reduce the moisture content. The total of which is at most 2000 ppm and desirably 500 ppm. Thus the total content of HF from the electrolyte and moisture of the entire battery is held to be under 10,000 ppm and therefore still anticipates the claims as set forth above.

While the declaration has been considered it is not found to be persuasive over the prior art rejection of JP '631. See items a-c in the Advisory Action mailed February 26, 2003, incorporated herein.

Applicant still has not provided clear evidence that the prior art electrodes have a moisture content which would elevate the overall moisture and acid content in the electrolyte solution to be in excess of 10,000 ppm. In fact such an argument appears to contradict that which the prior art of JP '631 teaches. As identified above paragraph [0073] discloses that the moisture content of the battery is at most 2000ppm and preferably 500ppm. The total concentration of water and HF in the battery is therefore less than 10,000 ppm.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 3 and 4 rejected under 35 U.S.C. 103(a) as being unpatentable over JP '631 in view of U.S. patent No. 5,807,646 (Iwata), all of record and for the reasons of record.

The teachings of claims 1 and 2 have been discussed above and are incorporated herein.

The difference between the instant claims and JP '631 is that JP '631 does not appear to disclose lithium manganese oxide of cubic system spinel structure containing lithium and manganese as the main components used as the positive electrode active substance (as recited in both claims 3 and 4).

The use of lithium manganese oxide materials as the positive electrode active substance is well described in the art.

The lithium-manganese oxide material is of high performance from the viewpoint of electrochemistry because of its increased discharge capacity and high stability in discharge capacity after repeated charge/discharge cycles, when used as an active material for a positive electrode in lithium secondary batteries. When the lithium-manganese oxide of the invention is used as an active material for a positive electrode in a lithium secondary battery, it is possible to operate the battery in an output voltage range as high as from 3.5 volts to 4.5 volts with an increased discharge capacity and a high stability in discharge capacity even after repeated charge/discharge cycles. These advantages have not been achieved by conventional Li--Mn oxides. It should also be appreciated that the present Li--Mn oxide can be packed efficiently so that this could

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lead to a lithium secondary battery having a relatively high capacity (Iwata, col. 15, ll. 4-30; as applied to claims 3 and 4).

The motivation for selecting the positive electrode active material to be lithium manganese oxide of cubic system spinel structure containing lithium and manganese as the main components is that it has increased discharge capacity and high stability in discharge capacity after repeated charge/discharge cycles, when used as an active material for a positive electrode in lithium secondary batteries.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '361 by selecting the positive electrode active material to be lithium manganese oxide of cubic system spinel structure containing lithium and manganese as the main components since it would have manufactured a battery having increased discharge capacity and high stability in discharge capacity after repeated charge/discharge cycles, when used as an active material for a positive electrode in lithium secondary batteries.

Furthermore, the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

9. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '361 in view of U.S. patent No. 5,792,577(Ejiri), all of record and for the reasons of record.

The teachings of claims 1 and 2 have been discussed above and are incorporated herein.

The difference between the instant claims and JP '631 is that JP '631 does not appear to disclose using highly graphitized carbon fiber as the negative electrode active substance (as recited in each of claims 5 and 6).

Use of highly graphitized carbon fibers in negative electrodes is desired due to graphite's large charge and discharge capacities (Ejiri col. 5, line 54 through col. 6, line 5). Furthermore, Ejiri discloses that the graphitized carbon negative electrode can be employed in a lithium secondary battery wherein the lithium electrolyte is LiPF₆ and the positive electrode is LiMnO (col. 14, ll. 65 through col. 15, line 10).

The motivation for using highly graphitized carbon fiber as the negative electrode active substance is that it would have provided a negative electrode having improved charge and discharge capacities.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP 361 by using highly graphitized carbon fiber as the negative electrode active substance since it would have provided a negative electrode having improved charge and discharge capacities.

10. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '361 in view of Iwata as applied to claims 1-4 above and in further view Ejiri, all of record and for the reasons of record.

The teachings of claims 1-4 have been discussed above and are incorporated herein.

The difference between the instant claims and JP '631 is that JP '631 does not appear to disclose using highly graphitized carbon fiber as the negative electrode active substance (as recited in each of claims 7 and 8).

Use of highly graphitized carbon fibers in negative electrodes is desired due to graphite's large charge and discharge capacities (Ejiri col. 5, line 54 through col. 6, line 5). Furthermore, Ejiri discloses that the graphitized carbon negative electrode can be employed in a lithium secondary battery wherein the lithium electrolyte is LiPF₆ and the positive electrode is LiMnO (col. 14, ll. 65 through col. 15, line 10).

The motivation for using highly graphitized carbon fiber as the negative electrode active substance is that it would have provided a negative electrode having improved charge and discharge capacities.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP 361 by using highly graphitized carbon fiber as the negative electrode active substance since it would have provided a negative electrode having improved charge and discharge capacities.

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '361 in view of U.S. patent No. 5,709,968 (Shimizu) or U.S. patent No. 6,053,953 (Tomiyaama), all of record and for the reasons of record.

The teachings of claims 1 and 2 have been discussed above and are incorporated herein.

The difference between the instant claims and JP '631 is that JP '631 does not appear to disclose using the battery in an electric automobile or hybrid electric automobile.

It is noted that the claimed invention is drawn to a lithium secondary battery and that the limitations of claim 10 do not further limit the structure of the battery but is rather an intended use for the battery of claim 1 in automobiles.

Use of lithium batteries in automobiles, electric automobiles is described in the art as shown by either Shimizu or Tomiyama.

A lightweight, large capacity, long-life and low cost secondary battery can be provided. Moreover, since the battery exhibits excellent safety and reliability, it can be used widely for, for example, a portable unit, a battery for a bicycle, an electric automobile, road leveling and the like. Thus, significantly multi-purpose characteristic can be obtained (Shimizu, col. 19, ll. 12-18).

Tomiyama is drawn to lithium secondary batteries wherein the electrolyte can be a lithium compound, lithium hexafluorophosphate (col. 15 ll. 25-42). The battery of Tomiyama can further be employed in automobiles or electric vehicles (col. 18, ll. 48-50).

The motivation for using the battery of JP '361 in an electric automobile is that it would have provided a power source to the electric automobile which has a long-life and is portable and reliable.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '361 since it is known to

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use lithium secondary batteries in electric vehicles since they would have fabricated a powered vehicle having a long-life, portable and reliable power source.

Response to Arguments

12. Applicant's arguments filed February 3, 2003 have been fully considered but they are not persuasive.

Applicant provides no further arguments to the obviousness rejections above apart from those arguments drawn to the 102(b) rejection of JP '631.

See item 6 above, incorporated herein. Since JP '631 is still held to teach the claimed invention as discussed above, and Applicant does not further argue the application of the secondary references apart from the arguments to JP '631, the obviousness rejections of claims 3-8 and 10 stand.

Claim Rejections - 35 USC § 103

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 6,053,953 (Tomiya) in view of JP '361, all of record and for the reasons of record.

Tomiya is drawn to lithium secondary batteries wherein the electrolyte can be a lithium compound, lithium hexafluorophosphate (col. 15 ll. 25-42). The battery of Tomiya can further be employed in automobiles or electric vehicles (col. 18, ll. 48-50 as applied to claim 10).

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The difference between the instant claims and Tomiyama is that Tomiyama does not disclose the lithium battery having a non-aqueous electrolytic solution containing a lithium compound wherein the solution contains water and hydrofluoric acid in a total concentration of 10,000 ppm or less.

The motivation for using the battery of JP '361 in an electric automobile is that it would have provided a lithium secondary battery having reduced water and hydrofluoric acid and have high capacity and excellent charge and discharge characteristics.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Tomiyama by using the battery configuration of JP '361 since it would have provided a lithium secondary battery having reduced water and hydrofluoric acid and have high capacity and excellent charge and discharge characteristics.

Response to Arguments

14. Applicant's arguments filed February 3, 2003 have been fully considered but they are not persuasive.

Applicant argues that JP '631 fails to teach or suggest the water and acid concentration of the electrolyte. The Examiner respectfully disagrees.

See item 6 above, incorporated herein, for the Examiner's response to Applicant's arguments to JP '631.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 1-10 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 and 12 of copending Application No. 09/770,725 in view of either JP '361, DE 198 27 631 A1 (DE '631), or WO 99/34471 (WO '471).

For claim review purposes, the examiner has cited U.S. patent Application Publication No. US 2001/0016291 A1 which is the published application of copending Application No. 09/770,725.

Copending Application No. 09/770,725 claims a lithium secondary battery comprising: an electrode unit produced by winding or laminating a positive electrode and a negative electrode via a separator, and a non-aqueous electrolytic solution containing a lithium compound as an electrolyte (copending claim 1 as applied to claim 1).

The lithium compound is lithium hexafluorophosphate (copending claim 2 as applied to claim 2).

A lithium manganese oxide containing lithium and manganese as the main components and having a cubic system spinel structure is used as the positive electrode (copending claims 3 and 4 as applied to instant claims 3 and 4).

A highly graphitized carbon fiber filler is used as the negative electrode active substance (copending claims 5-7 as applied to instant claims 5-8).

The lithium secondary battery has a battery capacity of 2 Ah or more (copending claim 8 as applied to claim 9).

The battery is used in an electric automobile or a hybrid electric automobile (copending claim 12 as applied to claim 10).

The difference between the instant claims and copending claim 1 is that the copending claim 1 does not recite that the non-aqueous electrolytic solution containing a lithium salt (lithium compound) wherein the electrolytic solution contains water and hydrofluoric acid in a total maximum concentration of 10,000 ppm or less.

The concept of reducing the water and hydrogen fluoride concentration in a non-aqueous electrolytic solution of a lithium secondary battery is well documented in the art as shown by either JP '361, DE '631 or WO '471.

More particularly JP '361 discloses of a non-aqueous electrolytic solution having a maximum water and HF (hydrofluoric acid) concentration of 150 ppm or less (abstract). DE '631 similarly discloses removing water and hydrogen fluoride from the non-aqueous electrolytic solution to a water concentration of less than 10 ppm and an

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HF acid concentration less than 30 ppm (abstract). And further WO '471 discloses of removing water and hydrogen fluoride from the non-aqueous electrolytic solution to a water concentration of not more than 3 ppm and an acid level of not more than 1 ppm (abstract),

Each of these references recognized that the battery charge and discharge capacity is improved when the water and acid content is reduced in the electrolytic solution (JP '361 abstract; DE '631 abstract WO '471 abstract).

The motivation for reducing the water and HF content in copending Application No. 09/770,725 is to improve the charge and discharge capacity of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the claims of copending Application No. 09/770,725 by selecting the electrolytic solution to have water and HF in a total concentration of 10,000 ppm or less since it would have improved the charge and discharge capacity of the battery.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

17. Applicant's arguments filed February 3, 2003 have been fully considered but they are not persuasive.

Applicant argues that DE 631, WO '471 and JP '631 fails to teach or suggest the water and acid concentration of the electrolyte. The Examiner respectfully disagrees.

See item 6 above, incorporated herein, for the Examiner's response to Applicant's arguments to JP '631.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo
Patent Examiner
Art Unit 1745


Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700

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April 8, 2003